IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Martha Gardner et. al.	§	Group Art Unit: 2166
Serial No.: 10/643,191	§	Confirmation No.: 3700
Filed: August 18, 2003	§	Examiner: Ahluwalia, Navneet K
For: METHOD AND SYSTEM FOR ASSESSING AND OPTIMIZING CRUDE SELECTION	§	Atty. Docket: 134734-1/SWA GERD: 0701

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November 13, 2007	/Tait R. Swanson/
Date	Tait R. Swanson

APPEAL BRIEF PURSUANT TO 37 C.F.R. §§ 41.31 AND 41.37

Sir:

This Appeal Brief is being filed in furtherance to the Notice of Appeal and the Pre-Appeal Brief Request for Review electronically filed on September 17, 2007, and in furtherance to the Panel Decision mailed on October 2, 2007.

The Commissioner is authorized to charge the requisite fee of $510.00, and any additional fees necessary to advance prosecution of the present application, to Account No. 07-0868, Order No. 134734-1/SWA (GERD:0701).

1. REAL PARTY IN INTEREST

The real party in interest is General Electric Company, the Assignee of the above-referenced application. Accordingly, General Electric Company, as the Assignee of the above-referenced application, will be directly affected by the Board's decision in the pending appeal.

2. RELATED APPEALS AND INTERFERENCES

Appellants are unaware of any other appeals or interferences related to this Appeal. The undersigned is Appellants' legal representative in this Appeal.

3. STATUS OF CLAIMS

Claims 1-4 and 6-28 are currently pending, are currently under final rejection and, thus, are the subject of this Appeal. Claim 6 is cancelled.

4. STATUS OF AMENDMENTS

The Appellants have not submitted any amendments subsequent to the Final Office Action mailed on July 20, 2007. Consequently, there are no outstanding amendments to be considered by the Board.

5. SUMMARY OF CLAIMED SUBJECT MATTER

The following provides a concise explanation of the subject matter defined in each of the claims involved in the appeal, referring to the specification by page and line number and to the drawings by reference characters, as required by 37 C.F.R. § 41.37(c)(1)(v). Each element of the claims is identified by a corresponding reference to the specification and drawings where applicable. Note that the citation to passages in the specification and drawings for each claim element does not imply that the limitations from the specification and drawings should be read into the corresponding claim element.

The Application contains three independent claims, namely, claims 1, 11, 17, 23 and 25, all of which are the subject of this Appeal. The subject matter of these claims is summarized below.

With regard to the aspect of the invention set forth in independent claim 1, discussions of the recited features of claim 1 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with the present invention relates to a system (e.g., 100) for assessing and optimizing crude selection, comprising a database (e.g., 102) storing data comprising crude characteristic data (e.g., 112) related to a plurality of different crudes or crude blends and crude processing data (e.g., 114) related to crude processing at a plurality of different operational conditions and a predictive engine (e.g., 104) having programmable instructions configured for execution by at least one processor. *See, e.g., id.*, paragraphs 23-30, 32-35, 37-39, 41, 43-44 and 47; *see also* FIGS. 1-5. The predictive engine is configured to assess similarity (e.g., 304, 404) of the crude characteristic data (e.g., 112) and the crude processing data (e.g., 114) of the plurality of different crudes or crude blends with input crude characteristic data (e.g., 106a, 106b) and input crude processing data (e.g., 108) of the respective crude or crude blend to output statistical best matches (e.g., 110) with the data stored in the database. *See, e.g., id.*, paragraphs 23-30, 32-35, 37-39, 41, 43-44 and 47; *see also* FIGS. 1-5. Further, the predictive engine is configured to execute at least one predictive performance and/or risk assessment model designed to optimize or improve a refining process based on the statistical best matches. *See, e.g., id.*, paragraphs 23-30, 32-35, 37-39, 41, 43-44 and 47; *see also* FIGS. 1-5.

With regard to the aspect of the invention set forth in independent claim 11, discussions of the recited features of claim 11 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with the present invention relates to a method for assessing and optimizing crude selection, comprising the steps of accessing (e.g., 302, 402) a database (e.g., 102)

for obtaining data comprising crude characteristic data (e.g., 112) related to a plurality of different stored crudes or crude blends and crude processing data (e.g., 114) related to crude processing at a plurality of different operational conditions, assessing similarity (e.g., 304, 404) of the crude characteristic data (e.g., 112) and the crude processing data (e.g., 114) of the plurality of different crudes or crude blends with input crude characteristic data (e.g., 106a, 106b) and input crude processing data (e.g., 108) of the respective crude or crude blend to output statistical best matches (e.g., 110) with the data stored in the database and executing at least one predictive performance and/or risk assessment model to optimize or improve a refining process for at least one crude or crude blend based on the statistical best matches. *See, e.g., id.*, paragraphs 23-30, 32-35, 37-39, 41, 43-44 and 47; *see also* FIGS. 1-5.

With regard to the aspect of the invention set forth in independent claim 17, discussions of the recited features of claim 17 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with the present invention relates to a computer readable medium storing a set of instructions configured for execution by at least one processor for performing the steps of accessing (e.g., 302, 402) a database (e.g., 102) for obtaining data comprising crude characteristic data (e.g., 112) related to a plurality of different stored crudes or crude blends and crude processing data (e.g., 114) related to crude processing at a plurality of different operational conditions, assessing similarity (e.g., 304, 404) of the crude characteristic data (e.g., 112) and the crude processing data (e.g., 114) of the plurality of different crudes or crude blends with input crude characteristic data (e.g., 106a, 106b) and input crude processing data (e.g., 108) of the respective crude or crude blend to output statistical best matches (e.g., 110) with the data stored in the database and executing at least one predictive performance and/or risk assessment model to optimize or improve a refining process for at least one crude or crude blend based on the statistical best matches. *See, e.g., id.*, paragraphs 23-30, 32-35, 37-39, 41, 43-44 and 47; *see also* FIGS. 1-5.

With regard to the aspect of the invention set forth in independent claim 23, discussions of the recited features of claim 23 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with the present invention relates to a system (e.g., 100) comprising a crude analyzer configured to compare a selected crude type (e.g., 106a, 106b) and a selected refinery parameter (e.g., 108) with historical data comprising crude data (e.g., 112) related to a plurality of crude types and refinery data (e.g., 114) related to a plurality of refineries, wherein the crude analyzer is configured to identify (e.g., 110) one or more crude types and one or more refinery parameters in the historical data that are statistically similar (e.g., 304, 404) to the selected crude type and the selected refinery parameter, respectively and a refinery optimizer configured to improve a refining process for the selected crude type and the selected refinery parameter based on the one or more crude types and the one or more refinery parameters identified by the crude analyzer. *See, e.g., id.*, paragraphs 23-30, 32-35, 37-39, 41, 43-44 and 47; *see also* FIGS. 1-5.

With regard to the aspect of the invention set forth in independent claim 25, discussions of the recited features of claim 25 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with the present invention relates to a method comprising comparing a selected crude type (e.g., 106a, 106b) and a selected refinery parameter (e.g., 108) with historical data comprising crude data (e.g., 112) related to a plurality of crude types and refinery data (e.g., 114) related to a plurality of refineries, wherein comparing a selected crude type and a selected refinery parameter comprises identifying (e.g., 110) one or more crude types and one or more refinery parameters in the historical data that are statistically similar (e.g., 304, 404) to the selected crude type and the selected refinery parameter, respectively; and improving a refining process for the selected crude type and the selected refinery parameter based on the one or more crude types and the one or more refinery parameters identified in the comparing step. *See, e.g., id.*, paragraphs 23-30, 32-35, 37-39, 41, 43-44 and 47; *see also* FIGS. 1-5.

A benefit of the invention, as recited in these claims, is to assess and select crudes and crude blends that are not of optimum quality, as well as to select appropriate chemical treatments and conditions to minimize operating problems with processing such crudes. *See, e.g., id.*, paragraphs 2, 5-9, 23-26, 30, 41, 43, 44, 49, 50, 54, 113, 124, 127 and 131-132.

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Sole Ground of Rejection for Review on Appeal:

Appellants respectfully urge the Board to review and reverse the rejection of claims 1-4 and 6-28 under 35 U.S.C. § 103(a) as being unpatentable over Phillips (US Patent No. 6,792,399 B1, hereinafter "Phillips") in view Henley (Patent No. EP1102187 A2, hereinafter "Henly").

7. ARGUMENT

As discussed in detail below, the Examiner has improperly rejected the pending claims. Further, the Examiner has misapplied long-standing and binding legal precedents and principles in rejecting the claims under Section 103. Accordingly, Appellants respectfully request full and favorable consideration by the Board, as Appellants assert that claims 1-4 and 6-28 are currently in condition for allowance.

A. Sole Ground of Rejection:

The Examiner rejected 1-4 and 6-28 under 35 U.S.C. § 103(a) as being unpatentable over Phillips in view Henley. Claims 1, 11, 17, 23, and 25 are independent and will be discussed in detail below.

Legal Precedent and Guidelines

The pending claims must be given an interpretation that is reasonable and consistent with the *specification*. *See In re Prater*, 415 F.2d 1393, 1404-05, 162 U.S.P.Q. 541, 550-51 (C.C.P.A. 1969) (emphasis added); *see also In re Morris,* 127 F.3d 1048,

1054-55, 44 U.S.P.Q.2d 1023, 1027-28 (Fed. Cir. 1997); *see also* M.P.E.P. §§ 608.01(o) and 2111. Indeed, the specification is "the primary basis for construing the claims." *See Phillips v. AWH Corp.*, No. 03-1269, -1286, at 13-16 (Fed. Cir. July 12, 2005) (*en banc*). One should rely *heavily* on the written description for guidance as to the meaning of the claims. *See id.*

Interpretation of the claims must also be consistent with the interpretation that *one of ordinary skill in the art* would reach. *See In re Cortright*, 165 F.3d 1353, 1359, 49 U.S.P.Q.2d 1464, 1468 (Fed. Cir. 1999); M.P.E.P. § 2111. "The inquiry into how a person of ordinary skill in the art understands a claim term provides an objective baseline from which to begin claim interpretation." *See Collegenet, Inc. v. ApplyYourself, Inc.*, 418 F.3d 1225, 75 U.S.P.Q.2d 1733, 1738 (Fed. Cir. 2005) (quoting *Phillips v. AWH Corp.*, 75 U.S.P.Q.2d 1321, 1326). The Federal Circuit has made clear that derivation of a claim term must be based on "usage in the ordinary and accustomed meaning of the words amongst artisans of ordinary skill in the relevant art." *See id.*

The burden of establishing a *prima facie* case of obviousness falls on the Examiner. *Ex parte Wolters and Kuypers*, 214 U.S.P.Q. 735 (PTO Bd. App. 1979). In addressing obviousness determinations under 35 U.S.C. § 103, the Supreme Court in *KSR International Co. v. Teleflex Inc.*, No. 04-1350 (April 30, 2007), reaffirmed many of its precedents relating to obviousness including its holding in *Graham v. John Deere Co.*, 383 U.S. 1 (1966). In *Graham*, the Court set out an objective analysis for applying the statutory language of §103:

> Under §103, the scope and content of the prior art are to be determined, differences between the prior art and the claims at issue are to be ascertained, and the level of ordinary skill in the pertinent art are to be resolved. Against this background the obviousness or non-obviousness of the subject matter is to be determined. Such secondary considerations as commercial success, long-felt but unresolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin

> of the subject matter sought to be patented. *KSR*, s*lip op.* at 2 (citing *Graham*, 383 U.S. at 17-18).

In *KSR*, the Court also reaffirmed that "a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art." *Id.* at 14. In this regard, the *KSR* court stated that "it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does ... because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known." *Id.* at 14-15. Traditionally, to establish a *prima facie* case of obviousness, the CCPA and the Federal Circuit have required that the prior art not only include all of the claimed elements, but also some teaching, suggestion, or motivation to combine the known elements in the same manner set forth in the claim at issue. *See, e.g., ASC Hospital Systems Inc. v. Montifiore Hospital,* 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984) (holding that obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention absent some teaching or suggestion supporting the combination.); *In re Mills,* 16 U.S.P.Q.2d 1430, 1433 (Fed. Cir. 1990) (holding that the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination). In *KSR*, the court noted that the demonstration of a teaching, suggestion, or motivation to combine provides a "helpful insight" in determining whether claimed subject matter is obvious. *KSR, slip op.* at 14. However, the court rejected a *rigid* application of the "TSM" test. *Id.* at 11. In this regard, the court stated:

> The obviousness analysis cannot be confined by a formalistic conception of the words teaching, suggestion, and motivation, or by overemphasis on the importance of published articles and explicit content of issued patents. The diversity of inventive pursuit and of modern technology counsels against limiting the analysis in this way. In many fields it may be that there is little discussion of obvious techniques or combinations, and it

> often may be the case that market demand, rather than scientific literature, will drive design trends. *Id.* at 15.

In other words, the *KSR* court rejected a rigid application of the TSM test which requires that a teaching, suggestion or motivation to combine elements in a particular manner must be explicitly found in the cited prior art. Instead, the *KSR* court favored a more expansive view of the sources of evidence that may be considered in determining an apparent reason to combine known elements by stating:

> Often, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art all in order to determine whether there was an apparent reason to combine in the known elements in the fashion claimed in the patent at issue. *Id.* at 14.

The *KSR* court also noted that there is not necessarily an inconsistency between the idea underlying the TSM test and the *Graham* analysis, and it further stated that the broader application of the TSM test found in certain Federal Circuit decisions appears to be consistent with *Graham*. *Id.* at 17-18 (citing *DyStar Textilfarben GmbH and Co. v. C.H. Patrick Co.,* 464 F.3d 1356, 1367 (2006) ("Our suggestion test is in actuality quite flexible and not only permits but *requires* consideration of common knowledge and common sense"); *Alza Corp. v. Mylan Labs, Inc.,* 464 F.3d 1286, 1291 (2006) ("There is flexibility in our obviousness jurisprudence because a motivation may be found *implicitly* in the prior art. We do not have a rigid test that requires a teaching to combine … ")).

Furthermore, the *KSR* court did not diminish the requirement for objective evidence of obviousness. *Id.* at 14 ("To facilitate review, this analysis should be made explict. See *In re Kahn,* 441 F.3d 977, 988 (CA Fed. 2006) ("[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness"). As our precedents make clear, however, the analysis need

not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ."); *see also, In re Lee,* 61 U.S.P.Q.2d 1430, 1436 (Fed. Cir. 2002) (holding that the factual inquiry whether to combine references must be thorough and searching, and that it must be based on *objective evidence of record*).

When prior art references require a selected combination to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gained from the invention itself, i.e., something in the prior art as a whole must suggest the desirability, and thus the obviousness, of making the combination. *Uniroyal Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 5 U.S.P.Q.2d 1434 (Fed. Cir. 1988). One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988). The Federal Circuit has warned that the Examiner must not, "fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher." *In re Dembiczak*, F.3d 994, 999, 50 U.S.P.Q.2d 52 (Fed. Cir. 1999) (quoting *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 U.S.P.Q. 303, 313 (Fed. Cir. 1983)).

It is improper to combine references where the references teach away from their combination. *In re Grasselli*, 713 F.2d 731, 743, 218 U.S.P.Q. 769, 779 (Fed. Cir. 1983); M.P.E.P. § 2145. Moreover, if the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 U.S.P.Q. 349 (CCPA 1959); *see* M.P.E.P. § 2143.01(VI). If the proposed modification or combination would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984); *see* M.P.E.P. § 2143.01(V).

In addition, "it is well established that product claims may include process steps to wholly or partially define the claimed product." *In re Luck*, 177 U.S.P.Q. 523, 525 (C.C.P.A. 1973). To the extent that "these process limitations distinguish the *product* over the prior art, they must be given the same consideration as traditional product characteristics." *Id.* (emphasis in original). These claims are not product-by-process claims. A product-by-process claim defines a product by laying out the method steps required to produce the product. *See Atlantic Thermoplastics Co. Inc. v. Faytex Corp.*, 23 U.S.P.Q.2d 1481, 1490 (Fed. Cir. 1992). This is far different from a mixed limitation or hybrid claim that includes a functional limitation, but does not define the product solely by method steps. The general rule for interpreting hybrid claims is that all limitations are to be given patentable effect. *See In re Angstadt*, 190 U.S.P.Q. 214, 217 (C.C.P.A. 1976).

In order to rely on equivalence as a rational supporting an obviousness rejection, the equivalency must be recognized in the prior art, and cannot be based on applicant's disclosure or the mere fact that the components at issue are functional or mechanical equivalents. *In re Ruff*, 256 F.2d 590, 118 U.S.P.Q. 340 (CCPA 1958); *see also* M.P.E.P. § 2144.06.

Non-analogous art cannot properly be pertinent prior art under 35 U.S.C. § 103. *In re Pagliaro*, 210 U.S.P.Q. 888, 892 (C.C.P.A. 1981). For the teachings of a reference to be prior art under 35 U.S.C. § 103, there must be some basis for concluding that the reference would have been considered by one skilled in the particular art working on the particular problem with which the invention pertains. *In re Horne*, 203 U.S.P.Q. 969, 971 (C.C.P.A. 1979). The determination of whether a reference is from a non-analogous art is set forth in a two-step test given in *Union Carbide Corp. v. American Can Co.*, 724 F.2d 1567, 220 U.S.P.Q. 584 (Fed. Cir. 1984). In *Union Carbide*, the court found that the first determination was whether "the reference is within the field of the inventor's endeavor." If it is not, one must proceed to the second step "to determine whether the

reference is reasonably pertinent to the particular problem with which the inventor was involved." In regard to the second step, *Bott v. Fourstar Corp*., 218 U.S.P.Q. 358 (E.D. Mich. 1983) determined that "analogous art is that field of art which a person of ordinary skill in the art would have been apt to refer in attempting to solve the problem solved by a proposed invention." "To be relevant the area of art should be where one of ordinary skill in the art would be aware that similar problems exist." *Id.*

Improper Combination - Lack of Objective Evidence of Reasons to Modify/Combine

In addition, the Examiner has not shown objective evidence of the requisite motivation or suggestion to modify or combine the cited references to reach the present claims. As summarized above, the *KSR* court did not diminish the requirement for objective evidence of obviousness. *KSR*, s*lip op.* at 14 ("To facilitate review, this analysis should be made explict. See *In re Kahn,* 441 F.3d 977, 988 (CA Fed. 2006) ("[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness"). As our precedents make clear, however, the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ."); s*ee also, In re Lee,* 61 U.S.P.Q.2d 1430, 1436 (Fed. Cir. 2002) (holding that the factual inquiry whether to combine references must be thorough and searching, and that it must be based on *objective evidence of record*). In the present rejection, the Examiner combined the cited references based on the *conclusory and subjective statement* that "[i]t would have been obvious to one of ordinary skill in the art of data processing at the time of the present invention to combine the teachings of cited references because Henly's prediction of properties of and optimization of plant's output of products in combination with the prediction models and risk analyzer of Phillips would result in accurate prediction of the crude oil blend to be used (paragraph 0004 and 0012, Henly)." Final Office Action, page 6. Accordingly, in view of the missing objective evidence, the Appellants respectfully

stress that the foregoing combination cannot stand. Therefore, the Appellants respectfully request withdrawal of the foregoing combination and allowance of all pending claims.

Improper Combination – References Teach Different Principles of Operation.

In addition, the cited references teach contrastingly different intended purposes and principles of operation, which would change if the cited references were hypothetically combined as suggested by the Examiner. As summarized above, a proposed modification or combination of references is entirely improper and insufficient to support a *prima facie* case of obviousness, where the proposed modification or combination would change the principle of operation of the cited reference or render the cited reference unsatisfactory for its intended purpose.

The primary reference (Phillips) teaches a principle of operation of improved techniques for forecasting the values of variables, such as the price of a share of stock or a commodity. More specifically, the invention is directed to improved combination forecasting by using clusterization. *See* Phillips; col. 10, line 56 – col. 11, line 33; and col. 42, line 26 – col. 47, line 18. Thus, the principle of operation of the primary reference requires combining predictions of the value of a financial and/or economic measure that represents an aspect of an existing economic environment from a group of forecasters. *See id.* at FIG. 9; col. 30, line 60 – col. 32, lines 19. In other words, the primary reference combines the predictions of stock prices by various people/analysts to provide an average prediction of the stock price, thereby improving the predicting of the stock price.

In contrast, the secondary reference (Henly) teaches a principle of operation of prediction of the properties of and the optimization of a plant's output of products from a source or sources of raw material. More specifically, the reference relates to a process and method for increasing the predictability and profitability of operations where a series of raw materials are combined and processed into intermediate or final products by

optimizing the cost structure of the raw materials, and the output of final or intermediate products to result in the lowest cost materials input and highest value production output. *See* Henley, page 6; paragraph 62. The reference also relates to the optimization of refining processes and petroleum blending operation to result in the highest value production output from available fuel stocks. *See id.* at page 6; paragraph 65. The reference also relates to the accurate prediction of final properties of a blended fuel utilizing non-linear optimization and property prediction. See id. at page 7; paragraph 70. Thus, the principle of operation of the secondary reference requires predicting a characteristic of a product to be prepared by a processing plant by means of regressive analysis of an accumulation of data relating to a number of measured properties of the incoming material, the process of the plant and a number of characteristics of the product. *See id.* at page 16; paragraph 105.

In view of these contrasting different principles of operation, the Examiner's proposed combination of the primary and secondary references is absolutely improper and cannot stand. Any combination of the primary and secondary references would change the principle of operation of the primary reference to one of combining forecasts of financial and/or economic measure based on regressive analysis. In a similar manner, the proposed combination of the primary and secondary references would change the principle of operation of the secondary reference to one of predicting characteristics of a product to be prepared by a processing plant by means of cluster analysis of data relating to various characteristics of the materials and the product. In view of these incompatible principles of operation, the cited references cannot be combined and the Examiner's rejection is improper.

Request Removal of Non-Analogous Art

Based on the foregoing two-part non-analogous art test, the Phillips reference does not qualify as analogous art. In regard to the first step of the *Bott* test, the Phillips reference is directed to developing a technique for predicting a value of a financial and/or

economic measure that represents an aspect of an existing economic environment. Therefore, the Phillips reference is not in the field of the Applicants endeavor. In regard to the second step of the *Bott* test, the Phillips reference is not pertinent to the problem addressed by the present patent application which is directed to a technique for refining crude oil and assessing and optimizing crude selection to assist oil refineries in assessing and selecting crudes and crude blends that are not of optimum quality. Thus, there is no evidence whatsoever that similar problems exist in these disparate fields of art. Accordingly, the Phillips reference is believed to be non-analogous art. Appellants respectfully request the removal of the Phillips reference from consideration. For at least these reasons among others, the Appellants respectfully request withdrawal of the foregoing combination the corresponding rejections under 35 U.S.C. § 103.

Features of Independent Claims 1, 11, and 17 Missing from References

Specifically, amended independent claim 1 recites, *inter alia*, a system for assessing and optimizing crude selection comprising "a database storing data comprising crude characteristic data related to a plurality of different crudes or crude blends" and a predictive engine "configured to assess similarity of the crude characteristic data and the crude processing data of the plurality of different crudes or crude blends with input crude characteristic data and input crude processing data of the respective crude or crude blend." Amended independent claim 11 recites, *inter alia* a method for assessing and optimizing crude selection comprising the steps of, "accessing a database for obtaining data comprising crude characteristic data related to a plurality of different stored crudes or crude blends" and "assessing similarity of the crude characteristic data and the crude processing data of the plurality of different crudes or crude blends with input crude characteristic data and input crude processing data of the respective crude or crude blend." Amended independent claim 17 recites, *inter alia*, a computer readable medium storing a set of instructions configured for execution by at least one processor for performing the steps of "accessing a database for obtaining data comprising crude characteristic data related to a plurality of different stored crudes or crude blends" and

"assessing similarity of the crude characteristic data and the crude processing data of the plurality of different crudes or crude blends with input crude characteristic data and input crude processing data of the respective crude or crude blend."

Phillips fails to teach or suggest the foregoing feature of amended independent claims 1, 11, and 17. Phillips discloses a technique for forecasting the values of variables, such as the price of a share of stock or commodity. In particular, Phillips discloses a technique for providing combination forecasts (obtained from a group of forecasters) for a value of a financial and/or economic measure that represents an aspect of an existing economic environment. However, such a technique for providing combination forecasts is not equivalent or even similar to a technique for storing data comprising crude characteristic data related to a plurality of different crudes or crude blends and assess similarity of the crude characteristic data and the crude processing data of the plurality of different crudes or crude blends with input crude characteristic data and input crude processing data of the respective crude or crude blend as recited by the present claims. Appellants have carefully reviewed the sections (column 8, lines 12-21 and 31-41; column 9, lines 34-44 and column 56, lines 47-56) referenced by the Examiner and submit that these sections fail to disclose the foregoing claim features.

The secondary reference of Henly fails to obviate the deficiencies in the teachings of Phillips. Henly discloses a process for the prediction and the optimization of the output of a plant producing products from incoming materials. Appellants have carefully reviewed the sections (paragraph 0004 and 0012) referenced by the Examiner and submit that these sections fail to disclose storing data comprising crude characteristic data related to a plurality of different crudes or crude blends and assessing similarity of the crude characteristic data and the crude processing data of the plurality of different crudes or crude blends with input crude characteristic data and input crude processing data of the respective crude or crude blend. Instead, these sections relate to a process and method for the prediction of the properties of and the optimization of a plant's output of products

from a source or sources of raw material. For example, Henly specifically discloses that "the computing device will determine the accurate properties of the outcoming product and the optimum value to be extracted for a production run based on the available data." Henly, paragraph [0010] (emphasis added). By further example, Henly discloses one embodiment in which "a method is disclosed utilizing linear and non linear equations to more accurately predict the cetane number, pour point, and/or other properties of the resulting fuel product." Henly, paragraph [0011] (emphasis added). For at least this reason, among others, the hypothetical combination of Phillips and Henly cannot support a *prima facie* case of obviousness of the present claims.

In short, neither of the references teaches or suggests storing data to a plurality of different crudes or crude blends and assessing similarity of crude characteristic data and crude processing data of the plurality of different crudes or crude blends with input crude characteristic data and input crude processing data of the respective crude or crude blend to output statistical best matches with the data stored in the database. Consequently, no combination of the references could render such features obvious. In view of the above-noted distinctions, Appellants submit that claims 1, 11 and 17 are neither the same as, nor in any way taught or suggested by Phillips or Henly taken either alone or in hypothetical combination. In view of the foregoing deficiencies in the teachings of the prior art, the references cannot establish a *prima facie* case of obviousness of independent claims 1, 11 and 17. Accordingly, these claims are believed to be clearly patentable over the cited combination. Dependent claims 2-4 and 6-10, 12-16 and 18-22 depend from allowable independent claims 1, 11 and 17. Accordingly, these claims are believed to be clearly patentable over the cited combination by way of these dependencies and by way of additional features recited in each respective claim.

Features of Independent Claims 23 and 25 Missing from References

Independent claim 23 recites, *inter alia*, a system comprising "a crude analyzer configured to compare a selected crude type and a selected refinery parameter with

historical data comprising crude data related to a plurality of crude types and refinery data related to a plurality of refineries, wherein the crude analyzer is configured to identify one or more crude types and one or more refinery parameters in the historical data that are statistically similar to the selected crude type and the selected refinery parameter, respectively". Independent claim 25 recites, *inter alia* a method comprising the step of, "comparing a selected crude type and a selected refinery parameter with historical data comprising crude data related to a plurality of crude types and refinery data related to a plurality of refineries, wherein comparing a selected crude type and a selected refinery parameter comprises identifying one or more crude types and one or more refinery parameters in the historical data that are statistically similar to the selected crude type and the selected refinery parameter, respectively".

Phillips fails to teach or suggest the foregoing feature of amended independent claims 23 and 25. Phillips discloses a technique for forecasting the values of variables, such as the price of a share of stock or commodity. In particular, Phillips discloses a technique for providing combination forecasts (obtained from a group of forecasters) for a value of a financial and/or economic measure that represents an aspect of an existing economic environment. However, such a technique for providing combination forecasts is not equivalent or even similar to a technique for compare a selected crude type and a selected refinery parameter with historical data comprising crude data related to a plurality of crude types and refinery data related to a plurality of refineries, wherein the crude analyzer is configured to identify one or more crude types and one or more refinery parameters in the historical data that are statistically similar to the selected crude type and the selected refinery parameter, as recited by the present claims. Appellants have carefully reviewed the sections (column 8, lines 12-21 and 31-41; column 9, lines 34-44 and column 56, lines 47-56) referenced by the Examiner and submit that these sections fail to disclose the foregoing claim features.

The secondary reference of Henly fails to obviate the deficiencies in the teachings of Phillips. Henly discloses a process for the prediction and the optimization of the output of a plant producing products from incoming materials. Appellants have carefully reviewed the sections (paragraph 0004 and 0012) referenced by the Examiner and submit that these sections fail to disclose comparing a selected crude type and a selected refinery parameter with historical data comprising crude data related to a plurality of crude types and refinery data related to a plurality of refineries, wherein the crude analyzer is configured to identify one or more crude types and one or more refinery parameters in the historical data that are statistically similar to the selected crude type and the selected refinery parameter, respectively. Instead, these sections relate to a process and method for the prediction of the properties of and the optimization of a plant's output of products from a source or sources of raw material. For example, Henly specifically discloses that "the computing device will determine the accurate properties of the outcoming product and the optimum value to be extracted for a production run based on the available data." Henly, paragraph [0010] (emphasis added). By further example, Henly discloses one embodiment in which "a method is disclosed utilizing linear and non linear equations to more accurately predict the cetane number, pour point, and/or other properties of the resulting fuel product." Henly, paragraph [0011] (emphasis added). For at least this reason, among others, the hypothetical combination of Phillips and Henly cannot support a *prima facie* case of obviousness of the present claims.

In short, neither of the references teaches or suggests comparing a selected crude type and a selected refinery parameter with historical data comprising crude data related to a plurality of crude types and refinery data related to a plurality of refineries, wherein the crude analyzer is configured to identify one or more crude types and one or more refinery parameters in the historical data that are statistically similar to the selected crude type and the selected refinery parameter, respectively. Consequently, no combination of the references could render such features obvious. In view of the above-noted distinctions, Appellants submit that claims 23 and 25 are neither the same as, nor in any

way taught or suggested by Phillips or Henly, taken either alone or in hypothetical combination. In view of the foregoing deficiencies in the teachings of the prior art, the references cannot establish a *prima facie* case of obviousness of independent claims 23 and 25. Accordingly, these claims are believed to be clearly patentable over the cited combination. Dependent claims 24 and 26 depend from allowable independent claims 23 and 25. Accordingly, these claims are believed to be clearly patentable over the cited combination by way of these dependencies and by way of additional features recited in each respective claim.

For these reasons, among others, the Appellants respectfully request withdrawal of the foregoing rejections under 35 U.S.C. § 103 in view of Phillips and Henly.

Dependent claims 2, 12 and 18.

Dependent claim 2 recites, *inter alia*, that "the predictive engine takes as input crude information corresponding to at least one crude slate and at least one refinery operating parameter and/or condition and uses desirability metrics to assess similarity of the input to data in the database". Dependent claim 12 recites, *inter alia*, "taking as input crude information corresponding to the at least one crude or crude blend and at least one refinery operating parameter and/or condition and using desirability metrics to assess similarity of the input to data in the database, including the at least one stored crude or crude blend." Dependent claim 18 recites, *inter alia*, "taking as input crude information corresponding to the at least one crude or crude blend and at least one refinery operating parameter and/or condition and using desirability metrics to assess similarity of the input to data in the database, including the at least one stored crude or crude blend."

Phillips fails to teach or suggest the foregoing feature of dependent claims 2, 12, and 18. Phillips discloses a technique for forecasting the values of variables, such as the price of a share of stock or commodity. In particular, Phillips discloses a technique for providing combination forecasts (obtained from a group of forecasters) for a value of a

financial and/or economic measure that represents an aspect of an existing economic environment. Appellants have carefully reviewed the sections (column 11, lines 40-54 and column 10, lines 59-67) referenced by the Examiner and submit that these sections fail to disclose taking as input crude information corresponding to the at least one crude or crude blend and at least one refinery operating parameter and/or condition and using desirability metrics to assess similarity of the input to data in the database, including the at least one stored crude or crude blend.

Henly fails to obviate the deficiencies in the teachings of Phillips. Henly discloses a process for the prediction and the optimization of the output of a plant producing products from incoming materials. Appellants have carefully reviewed the sections (paragraph 0004 and 0012) referenced by the Examiner and submit that these sections fail to disclose taking as input crude information corresponding to the at least one crude or crude blend and at least one refinery operating parameter and/or condition and using desirability metrics to assess similarity of the input to data in the database, including the at least one stored crude or crude blend. Instead, these sections relate to a method for the prediction of the properties of and the optimization of a plant's output of products from a source or sources of raw material.

In view of the foregoing deficiencies in the teachings of the prior art, the references cannot establish a *prima facie* case of obviousness of claims 2, 12 and 18. Accordingly, these claims are believed to be clearly patentable over the cited combination. Their reconsideration and allowance are respectfully requested.

Again, as discussed above, the Examiner has not shown the requisite motivation or suggestion to modify or combine the cited references to reach the present claims. The Examiner must provide objective evidence, rather than subjective belief and unknown authority, of the requisite motivation or suggestion to combine or modify the cited references. *In re Lee*, 61 U.S.P.Q.2d. 1430 (Fed. Cir. 2002). Accordingly, in view of the

missing objective evidence, the Appellants respectfully stress that the foregoing combination cannot stand. Therefore, the Appellants respectfully request withdrawal of the foregoing combination and allowance of all pending claims.

Dependent claims 27 and 28.

Dependent claim 27 recites, *inter alia*, that "refinery optimizer is further configured to improve the refining process by optimizing performance of the refining process using information relating to a similar or identical crude slate and an associated chemical treatment, performance parameter, or risk parameter, or a combination thereof, based on the statistical similarity of the selected crude type and the selected refinery parameter with the one or more crude types and the one or more refinery parameters". Dependent claim 28 recites, *inter alia*, "improving comprises optimizing performance of the refining process using information relating to a similar or identical crude slate and an associated chemical treatment, performance parameter, or risk parameter, or a combination thereof, based on the statistical similarity of the selected crude type and the selected refinery parameter with the one or more crude types and the one or more refinery parameters."

Phillips fails to teach or suggest the foregoing features of dependent claims 27 and 28. Phillips discloses a technique for forecasting the values of variables, such as the price of a share of stock or commodity. In particular, Phillips discloses a technique for providing combination forecasts (obtained from a group of forecasters) for a value of a financial and/or economic measure that represents an aspect of an existing economic environment. Appellants have carefully reviewed the sections (column 11, lines 40-54 and column 44, lines 30-51) referenced by the Examiner and submit that these sections fail to disclose improving any refining process by optimizing performance of the refining process using information relating to a similar or identical crude slate and an associated chemical treatment, performance parameter, or risk parameter, or a combination thereof,

based on the statistical similarity of the selected crude type and the selected refinery parameter with the one or more crude types and the one or more refinery parameters.

Henly fails to obviate the deficiencies in the teachings of Phillips. Henly discloses a process for the prediction and the optimization of the output of a plant producing products from incoming materials. Appellants have carefully reviewed the sections (paragraph 0039 and 0043) referenced by the Examiner and submit that these sections fail to disclose improving any refining process by optimizing performance of the refining process using information relating to a similar or identical crude slate and an associated chemical treatment, performance parameter, or risk parameter, or a combination thereof, based on the statistical similarity of the selected crude type and the selected refinery parameter with the one or more crude types and the one or more refinery parameters. Instead, these sections relate to "crude oil assay manager whose function is to serve as a manager of a crude oil *library* and to output a *table of crude oil data* that is *recut* to the needs of the end user either for input into their linear production model or other applications" (paragraph 0039, Henley); and "*optimization model* types including linear programming problems, network problems, mixed integer programming problems, quadratic programming problems, and general non-linear programming problems". (paragraph 0043, Henley). (Emphasis added). The Appellants respectfully point out that maintaining a crude oil library; or outputting a table of data that is recut to end user's need cannot be equated with establishing statistical similarity and using information based on that similarity as recited in claims 27 and 28. Moreover, the recited elements in claims 27 and 28 teach establishing statistical similarity, which is completely different in approach and end objective from optimization problems as taught in the cited paragraphs of Henley.

In view of the foregoing deficiencies in the teachings of the prior art, the references cannot establish a *prima facie* case of obviousness of claims 27 and 28.

Accordingly, these claims are believed to be clearly patentable over the cited combination. Their reconsideration and allowance are respectfully requested.

Again, as discussed above, the Examiner has not shown the requisite motivation or suggestion to modify or combine the cited references to reach the present claims. The Examiner must provide objective evidence, rather than subjective belief and unknown authority, of the requisite motivation or suggestion to combine or modify the cited references. *In re Lee*, 61 U.S.P.Q.2d. 1430 (Fed. Cir. 2002). Accordingly, in view of the missing objective evidence, the Appellants respectfully stress that the foregoing combination cannot stand. Therefore, the Appellants respectfully request withdrawal of the foregoing combination and allowance of all pending claims.

For at least these reasons, among others, the Appellants respectfully request withdrawal of the foregoing rejections under 35 U.S.C. § 103.

Conclusion

In view of the amendments and remarks set forth above, Appellants respectfully request allowance of the pending claims. If the Examiner believes that a telephonic interview will help speed this application toward issuance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

Date: November 13, 2007

/Tait R. Swanson/

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8. APPENDIX OF CLAIMS ON APPEAL

Listing of Claims:

1. A system for assessing and optimizing crude selection comprising:

a database storing data comprising crude characteristic data related to a plurality of different crudes or crude blends and crude processing data related to crude processing at a plurality of different operational conditions; and

a predictive engine having programmable instructions configured for execution by at least one processor,

wherein the predictive engine is configured to assess similarity of the crude characteristic data and the crude processing data of the plurality of different crudes or crude blends with input crude characteristic data and input crude processing data of the respective crude or crude blend to output statistical best matches with the data stored in the database,

wherein the predictive engine is configured to execute at least one predictive performance and/or risk assessment model designed to optimize or improve a refining process based on the statistical best matches.

2. The system in accordance with Claim 1, wherein the predictive engine takes as input crude information corresponding to at least one crude slate and at least one refinery operating parameter and/or condition and uses desirability metrics to assess similarity of the input to data in the database.

3. The system in accordance with Claim 2, wherein the at least one refinery operating parameter and/or condition corresponds to a specific refinery, and wherein the at least one predictive performance or risk assessment model executed by the predictive engine predicts performance or risk measures of refining the at least one crude slate using the specific refinery for running the refining process, probability of problems occurring

during the refining process, and distribution of the problems throughout the refining process.

4. The system in accordance with Claim 1, wherein the predictive engine accesses treatment options stored within the database suitable for optimizing performance of the refining process.

6. The system in accordance with Claim 1, wherein the predictive engine comprises:

a crude search module which takes as input at least one crude name and/or at least one chemical or other characteristic of the at least one crude identifiable by the at least one crude name and outputs information with respect to at least one crude stored in the database, wherein the at least one crude output by the crude search module corresponds to at least one crude identifiable by the at least one crude name, or corresponds to at least one crude having at least one chemical or other property similar to at least one chemical or other property of the at least one crude identifiable by the at least one crude name;

an operating parameters/conditions search module which takes as input at least one refinery operating parameter and/or condition and outputs information stored in the database indicating at least one refinery having at least one identical or similar operating parameter and/or condition compared to the at least one refinery operating parameter and/or condition input; and

a crude slate and chemicals selection module which takes as input the information output by the crude search module and the information output by the operating parameters/conditions search module, and outputs at least one proposed crude slate, chemical treatment and/or performance or risk parameter.

7. The system in accordance with Claim 6, wherein the crude slate and chemicals selection module includes a first tier, wherein the first tier identifies at least one crude slate stored in the database which is similar to at least one user-desired crude

slate by scoring each crude slate component of the at least one user-desired crude slate based on how well the crude slate component satisfies user criteria, and combines all individual scores of the at least one user-desired crude slate to provide a composite crude slate score; wherein the first tier further scores each individual operating parameter and/or condition based on how well the individual operating parameter and/or condition satisfies the user criteria for that operating parameter and/or condition and outputs an operational score, and then combines all individual operational scores to provide a composite operational score; and wherein the first tier further determines a highest total overall score by combining the composite crude slate and composite operational scores.

8. The system in accordance with Claim 7, wherein the crude slate and chemicals selection module further includes a second tier, wherein the second tier includes as an input at least information derived by the first tier and obtains predicted response parameters of interest for selected crude slates, operational parameters and/or conditions, and/or chemical treatments using the at least one predictive performance model.

9. The system in accordance with Claim 1, wherein the predictive engine executes at least one optimization algorithm for the refining process.

10. The system in accordance with Claim 9, wherein the at least one predictive performance model and/or the at least one risk assessment model is a type of model selected from the group consisting of linear regression models; logistic regression models; non-linear regression models; classification and regression trees and extensions thereof; multiple additive regression splines and extensions thereof; partial least squares regression models; generalized additive models; neural networks and extensions thereof, such as projection pursuit regression; simulation models; expert system-based models, such as Bayesian Belief Networks; theoretical calculation models; engineering economic models; financial risk models; decision analytic models; and engineering process models

based on chemistry, physics and engineering principles, such as reaction kinetics and thermodynamics, mass transfer, energy transfer, separation processes, and fluid dynamics.

11. A method for assessing and optimizing crude selection comprising the steps of:

accessing a database for obtaining data comprising crude characteristic data related to a plurality of different stored crudes or crude blends and crude processing data related to crude processing at a plurality of different operational conditions;

assessing similarity of the crude characteristic data and the crude processing data of the plurality of different crudes or crude blends with input crude characteristic data and input crude processing data of the respective crude or crude blend to output statistical best matches with the data stored in the database; and

executing at least one predictive performance and/or risk assessment model to optimize or improve a refining process for at least one crude or crude blend based on the statistical best matches.

12. The method in accordance with Claim 11, further comprising the steps of:

taking as input crude information corresponding to the at least one crude or crude blend and at least one refinery operating parameter and/or condition; and

using desirability metrics to assess similarity of the input to data in the database, including the at least one stored crude or crude blend.

13. The method in accordance with Claim 12, wherein the at least one refinery operating parameter and/or condition corresponds to a specific refinery, and wherein the at least one predictive performance or risk assessment model predicts performance or risk measures of refining the at least one crude or crude blend using the specific refinery for running the refining process, probability of problems occurring during the refining process, and distribution of the problems throughout the refining process.

14. The method in accordance with Claim 11, further comprising the step of accessing treatment options stored within the database suitable for improving or optimizing performance of the refining process.

15. The method in accordance with Claim 11, further comprising the step of executing at least one optimization algorithm for the refining process.

16. The method in accordance with Claim 15, wherein the at least one predictive performance model and/or the at least one risk assessment model is a type of model selected from the group consisting of linear regression models; logistic regression models; non-linear regression models; classification and regression trees and extensions thereof; multiple additive regression splines and extensions thereof; partial least squares regression models; generalized additive models; neural networks and extensions thereof, such as projection pursuit regression; simulation models; expert system-based models, such as Bayesian Belief Networks; theoretical calculation models; engineering economic models; financial risk models; decision analytic models; and engineering process models based on chemistry, physics and engineering principles, such as reaction kinetics and thermodynamics, mass transfer, energy transfer, separation processes, and fluid dynamics.

17. A computer readable medium storing a set of instructions configured for execution by at least one processor for performing the steps of:

accessing a database for obtaining data comprising crude characteristic data related to a plurality of different stored crudes or crude blends and crude processing data related to crude processing at a plurality of different operational conditions;

assessing similarity of the crude characteristic data and the crude processing data of the plurality of different crudes or crude blends with input crude characteristic data and input crude processing data of the respective crude or crude blend to output statistical best matches with the data stored in the database; and

executing at least one predictive performance and/or risk assessment model to optimize or improve a refining process for at least one crude or crude blend based on the statistical best matches.

18. The computer readable medium in accordance with Claim 17, further performing the steps of:

taking as input crude information corresponding to the at least one crude or crude blend and at least one refinery operating parameter and/or condition; and

using desirability metrics to assess similarity of the input to data in the database, including the at least one stored crude or crude blend.

19. The computer readable medium in accordance with Claim 18, wherein the at least one refinery operating parameter and/or condition corresponds to a specific refinery, and wherein the at least one predictive performance and/or risk assessment model predicts performance or risk measures of refining the at least one crude or crude blend using the specific refinery for running the refining process, probability of problems occurring during the refining process, and distribution of the problems throughout the refining process.

20. The computer readable medium in accordance with Claim 17, further performing the step of accessing treatment options stored within the database suitable for optimizing performance of the refining process.

21. The computer readable medium in accordance with Claim 17, further performing the step of executing at least one optimization algorithm for the refining process.

22. The computer readable medium in accordance with Claim 21, wherein the at least one predictive performance model and/or the at least one risk assessment model is

a type of model selected from the group consisting of linear regression models; logistic regression models; non-linear regression models; classification and regression trees and extensions thereof; multiple additive regression splines and extensions thereof; partial least squares regression models; generalized additive models; neural networks and extensions thereof, such as projection pursuit regression; simulation models; expert system-based models, such as Bayesian Belief Networks; theoretical calculation models; engineering economic models; financial risk models; decision analytic models; and engineering process models based on chemistry, physics and engineering principles, such as reaction kinetics and thermodynamics, mass transfer, energy transfer, separation processes, and fluid dynamics.

23. A system, comprising:

a crude analyzer configured to compare a selected crude type and a selected refinery parameter with historical data comprising crude data related to a plurality of crude types and refinery data related to a plurality of refineries, wherein the crude analyzer is configured to identify one or more crude types and one or more refinery parameters in the historical data that are statistically similar to the selected crude type and the selected refinery parameter, respectively; and

a refinery optimizer configured to improve a refining process for the selected crude type and the selected refinery parameter based on the one or more crude types and the one or more refinery parameters identified by the crude analyzer.

24. The system of claim 23, wherein the refinery optimizer is configured to evaluate a plurality of treatment options.

25. A method, comprising:

comparing a selected crude type and a selected refinery parameter with historical data comprising crude data related to a plurality of crude types and refinery data related to a plurality of refineries, wherein comparing a selected crude type and a selected refinery

parameter comprises identifying one or more crude types and one or more refinery parameters in the historical data that are statistically similar to the selected crude type and the selected refinery parameter, respectively; and

improving a refining process for the selected crude type and the selected refinery parameter based on the one or more crude types and the one or more refinery parameters identified in the comparing step.

26. The method of claim 25, wherein improving comprises evaluating a plurality of treatment options.

27. The system of claim 23, wherein the refinery optimizer is further configured to improve the refining process by optimizing performance of the refining process using information relating to a similar or identical crude slate and an associated chemical treatment, performance parameter, or risk parameter, or a combination thereof, based on the statistical similarity of the selected crude type and the selected refinery parameter with the one or more crude types and the one or more refinery parameters.

28. The method of claim 25, wherein improving comprises optimizing performance of the refining process using information relating to a similar or identical crude slate and an associated chemical treatment, performance parameter, or risk parameter, or a combination thereof, based on the statistical similarity of the selected crude type and the selected refinery parameter with the one or more crude types and the one or more refinery parameters.

9. EVIDENCE APPENDIX

None.

10. RELATED PROCEEDINGS APPENDIX

None.